

Date: Thursday, 7/13/2006 4:00:10 PM
 User: Kim Johnston

Process Sheet

Customer : CU-DAR001 Dart Helicopters Services Drawing Name : SKID TUBE ASSEMBLY
 Job Number : 27914A
 Estimate Number : 10023
 P.O. Number : *N/A* Part Number : D205634041
 This Issue : 7/13/2006 S.O. No. : *N/A* Drawing Number : D2580 REV C
 Prsht Rev. : NC Project Number : N/A
 First Issue : *N/A* Type : LANDING GEAR Drawing Revision : C
 Previous Run : 27912A Material : *N/A*
 Written By : Due Date : 8/30/2006 Qty: 1 Um: Each
 Checked & Approved By : *JA 06.07.13*
 Comment : Est Rev: N 02.08.28 FP was QC5 in Step 27; Added QC5 to Step 30 KJ
 Est Rev. O 06.02.28 Added paperwork EC

Additional Product

Job Number:



Seq. #: Machine Or Operation: Description :

1.0 D25001190 Ext'n -I' Beam Tube 4"



Comment: Qty.: 1.0400 Each(s)/Unit Total : 1.0400 Each(s)

Pick:

Qty Part Number Description Batch
 1 D2500-1-190 Skid Tube Extrusion *B24669* *IT 06-07-20*

2.0 DC DOCUMENT CONTROL



Comment: DOCUMENT CONTROL

Photocopy D205-634 bluefile & type labels per PPP D205-634 CHG001

N/A.

3.0 D2596 205 Web



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Pick:

Qty Part Number Description Batch
 1 D2596 205 Web *B27655* *Pmc 06-07-21 (1)*

4.0 LANDING GEAR 1 LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1- Inspect mat'l D2500-1-190 for damage *IT - 06 07 - 20*

2-Cut D2500-1-190 per Dwg D2580 if necessary Deburr ends *IT 06-07-20*

3-Drill pilot holes using drill jig DT 8149 *IT 06-07-20*

4-Acid etch and Alodine tube per QSI 005 4.1 *IT 06-07-20*

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE		By	Date	Qty	Approval Mfg / Design Mgr	Approval QC Inspector

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action			Verification Section C	Approval Design Mgr	Approval QC Inspector
			Initial Design Mgr	Action Description Design Mgr	Sign & Date			

Part No: _____ PAR #: _____ Fault Category: _____

NOTE: Date & initial all entries

NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

Date: Thursday, 7/13/2006 4:00:10 PM
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Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: SKID TUBE ASSEMBLY

Job Number: 27914A

Part Number: D205634041

Job Number:



Seq. #:

Machine Or Operation:

Description :

5-Open holes to 0.500" as per Dwg D2580 without cutting fluid

6-Countersink holes as per Dwg D2580 without cutting fluid

7-Deburr and blow out all chips from inside of tube

8-Bond web in place per QSI 015. Allow 12 Hrs. cure time before cutting

Pick:

Qty Part Number Description Batch

A/R Sikaflex-291 M101621

Sikaflex expire date: 07-02-01

Start Time: 9:15

Fin Time: 8:15

PM 06-07-21

5.0

BENDING

BENDING MACHINE



Comment: BENDING MACHINE

1-Bend as per program D2580.C on CNC Bender and Folio FT009

2-Cut tubes as per Dwg. D2580

PM 06-07-27

6.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Deburr ends after cutting. Remove alodine from around holes

IT 06-07-31

7.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

8.0

D25763

Step (Machining Detail)



Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)

Pick:

Qty Part Number Description Batch

1 D2576-3

Step

B-23060-06 06-08-02

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE		By	Date	Qty	Approval Mfg / Design Mgr	Approval QC Inspector

NCR: 27914A		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action			Verification Section C	Approval Design Mgr	Approval QC Inspector
			Initial Design Mgr	Action Description Design Mgr	Sign & Date			
06-08-01	5	Tube is over bent on the fuel 32" section. Bend is 30.5 at the min. R.C. bend was started to far into the tube. operator error.	See e-mail attached.	Acceptable. No inter- distortion. rigging is ok for saddle C.I. see email	N/A.	06-08-01	See e-mail attached.	06-08-01

Part No: D205-634-041 PAR #: N/A Fault Category: RND - LG

NOTE: Date & initial all entries

NCR: Yes No DQA: QA: N/C Closed: Date: 06-08-24

Date: Thursday, 7/13/2006 4:00:10 PM
User: Kim Johnston

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: SKID TUBE ASSEMBLY

Job Number: 27914A

Part Number: D205634041

Job Number:



Seq. #:

Machine Or Operation:

Description:

9.0

D2579

Crossbolt Spacer



Comment: Qty.: 20.0000 Each(s)/Unit Total: 20.0000 Each(s)

Pick:

Qty	Part Number	Description	Batch
20	D2579	Spacers	B27167

BE 06-08-02

10.0

LARGE FAB 1

LARGE FABRICATION RESOURCE 1



Comment: LARGE FABRICATION RESOURCE 1

1-Prepare tube for welding D2576-3 StepRemove alodine as required.

BE 06-08-02

2-Weld step D2576 as per Dwg. D2580 and QSI 004

A/R

Aluminum Rod

M/00660

BE 06-08-02

3-Weld crossbolt spacers D2579 as per Dwg. D2580 and QSI 004. For D2579 side, pass 3/8" drill, weld other side, pass 3/8" drill

spacers, weld one

A/R

Aluminum Rod

M/00660

BE 06-08-02

4-Grind welds as per Dwg D2580 Grind flush ridge made from bending

PD BE 06-08-04

5-Drill holes for wearplates using DT 8217 Open holes to 19/64", adjust stopper not to hit web. Debur

6-Counterbore crossbolt spacers to 7/16" ID x 1.0" deep as per Dwg D2580. Debur holes

7-Drill pilot holes for aft cap using DT 8215 Open holes to #6 Drill bit. Debur

8-Drill pilot holes for Tow ring using DT8091, open to .640" and Debur

BE 06-08-04

11.0

QC5/9

WELD INSPECTION



Comment: WELD INSPECTION

Inspect weld and Counterbore work to Step 20

06-08-08 ①

PD 06-08-4 ①

12.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Powder Coat White (Ref: 4.3.5.2) as per QSI 005 4:3

PD 06/08/15 ①

W/O:		WORK ORDER CHANGES						
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Part No: _____ PAR #: _____ Fault Category: _____

NOTE: Date & initial all entries

NCR: Yes No DQA: _____ Date: _____

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Date: Thursday, 7/13/2006 4:00:11 PM
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Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: SKID TUBE ASSEMBLY

Job Number: 27914A

Part Number: D205634041

Job Number:



Seq. #:

Machine Or Operation:

Description :

13.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

a.m 06-08-15

14.0

D25771

Wearplate Fwd



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Pick:

Qty	Part Number	Description	Batch
1	D2577-1	Wearplate	<i>B26350</i>

15.0

D25773

Wearplate Aft



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Pick:

Qty	Part Number	Description	Batch
1	D2577-3	Wearplate	<i>B26058</i>

16.0

D25775

Wearplate, Centre



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Pick:

Qty	Part Number	Description	Batch
1	D2577-5	Wearplate	<i>B24199</i>

17.0

ALS71032130

Insert



Comment: Qty.: 44.0000 Each(s)/Unit Total : 44.0000 Each(s)

Pick:

Qty	Part Number	Description	Batch
44	ALS7-1032-130	Inserts	<i>M19393</i>

18.0

AN960JD10L

Washer



Comment: Qty.: 44.0000 Each(s)/Unit Total : 44.0000 Each(s)

Pick:

Qty	Part Number	Description	Batch
44	AN960JD10L	Washer	<i>M10233</i>

a.m 06-08-15

①

W/O:		WORK ORDER CHANGES						
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

NOTE: Date & initial all entries QA: N/C Closed: _____ Date: _____

Date: Thursday, 7/13/2006 4:00:11 PM
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Customer: CU-DAR001 Dart Helicopters Services

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Job Number: 27914A

Part Number: D205634041

Job Number:



Seq. #:

Machine Or Operation:

Description :

19.0

AN34A

Bolt



Comment: Qty.: 44.0000 Each(s)/Unit Total : 44.0000 Each(s)

Pick:

Qty	Part Number	Description	Batch
44	AN3-4A	Bolt	M18310

20.0

D25941

Plug



Comment: Qty.: 16.0000 Each(s)/Unit Total : 16.0000 Each(s)

Pick:

Qty	Part Number	Description	Batch
16	D2594-1	O-RING plug	B24104 B25597

21.0

D25943

O-Ring



Comment: Qty.: 16.0000 Each(s)/Unit Total : 16.0000 Each(s)

Pick:

Qty	Part Number	Description	Batch
16	D2594-3	Plug O-ring	B25597 B24104

22.0

D2855

Cap



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Cap

Batch: 826351

23.0

AN35A

Bolt



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Bolt

Batch: M15205

24.0

AN960JD10L

Washer



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Washer

Batch: M100233

Q.M 06-08-15 ①

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE		By	Date	Qty	Approval Mfg / Design Mgr	Approval QC Inspector

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action			Verification Section C	Approval Design Mgr	Approval QC Inspector
			Initial Design Mgr	Action Description Design Mgr	Sign & Date			

Part No: _____ PAR #: _____ Fault Category: _____

NOTE: Date & initial all entries

NCR: Yes ☒ No ☐ DQA: ☒ Date: 06/08/07

QA: N/C Closed: _____ Date: _____

Date: Thursday, 7/13/2006 4:00:11 PM
User: Kim Johnston

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: SKID TUBE ASSEMBLY

Job Number: 27914A

Part Number: D205634041

Job Number:



Seq. #:

Machine Or Operation:

Description :

25.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

1-Install inserts & wearplates as per Dwg. D2580. Use a drop of Sikaflex on insert holes before installing wearplates

A/R - Sikaflex-291 *M101621*

Sikaflex expire date: *02-07*

2-Coat D2594-3 O' rings with Petroleum Jelly and install on D2594-1 plugs as per Dwg D2580

3-Inspect for foreign object per QSI 024

4-Install 2855 Aft Cap as per Dwg D2580 and seal Fwd Step & Aft Cap with Sikaflex. Clean excess adhesive

A/R Sikaflex-291 *M101621*

Sikaflex expire date: *02-07*

a.m 06-08-15

(1)

5-Wing Walk as per Dwg D2580 and QSI 005 4.4

M101667

Batch:

FC 06 08 21 (1)

26.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: Inspect Aft Cap, Fwd Step and Wing Walk of work to Current Step inspect for Foreign objects per QSI 024

27.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and pack for shipping as per PPP D205-634-041.

Location:

PPP Rev:

N/A
06/08/23
(1)

28.0

DC

DOCUMENT CONTROL



Comment: DOCUMENT CONTROL

Inspection Level 21

06-08-24

Job Completion



06/08/23

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE		By	Date	Qty	Approval Mfg / Design Mgr	Approval QC Inspector

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action			Verification Section C	Approval Design Mgr	Approval QC Inspector
			Initial Design Mgr	Action Description Design Mgr	Sign & Date			

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

NOTE: Date & initial all entries

QA: N/C Closed: _____ Date: _____



DESIGN <i>[Signature]</i>	DRAWN BY <i>[Signature]</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>[Signature]</i>	APPROVED <i>[Signature]</i>	DRAWING NO. D2580	REV. C SHEET 1 OF 2
DATE 98.08.26		TITLE 205 SKIDTUBE ASSEMBLY	SCALE NTS
A	96.09.16	NEW ISSUE	
B	96.12.02	AS MANUFACTURED	
C	98.08.26	REDRAWN, INCLUDED DEO 9094/9097	

RELEASED
98/09/17 DS

QTY	Part Number	Description
X	D2580-041	SKIDTUBE ASSEMBLY
*	D2500-1	EXTRUSION
1	D2596	205 WEB
1	D2575	AFT CAP
1	D2576 - 3	STEP
20	D2579	CROSS BOLT SPACER
16	D2594-1	PLUG
16	D2594-3	O-RING
1	D2577-1	WEARSHOE
1	D2577-3	WEARSHOE
1	D2577-5	WEARSHOE
44	ALS7-1032-130 or AKS7-1032-130 or AKS4-1032-130 or ALS4-1032-130	INSERT
46	AN3-4A	BOLT
46	AN960JD10L	WASHER

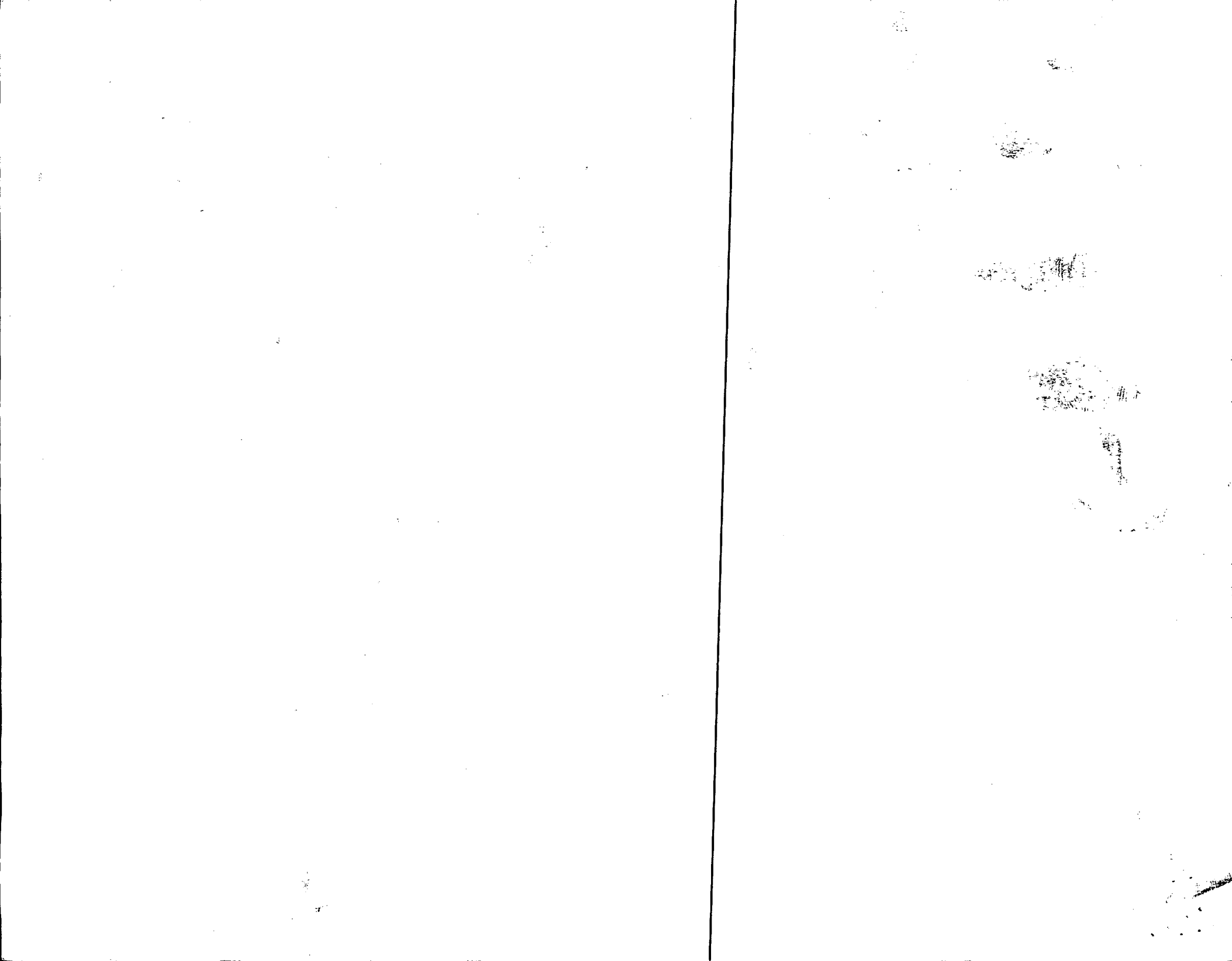
00.08.28
UP 00.08.28

EFFECTIVE DEOS
98/12/14
DEO 9124
DED 9183

GENERAL NOTES:

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- 2) LENGTH OF D2500-1 EXTRUSION BEFORE BENDING = 190 INCHES *
- 3) INSERT D2596 WEB TO LOCATION SHOWN OFF AFT END OF SKIDTUBE AND BOND WEB INTO OUTER TUBE WITH NON-STRUCTURAL SIKAFLEX-241 ADHESIVE PER DART QSI 015 BEFORE BENDING. ENSURE HOLES LINE-UP.
- 4) BEND AS A SMOOTH RADIUS STARTING WITH A MAXIMUM CENTERLINE RADIUS OF 60 AND ENDING WITH A MINIMUM RADIUS OF 30. A MAXIMUM REDUCTION OF 0.200 IN DIAMETER IS ALLOWABLE IN THE BENT PORTION OF THE TUBE.
- 5) USE DART DRILL TEMPLATE TD2577-205 TO LOCATE AND DRILL Ø0.297 HOLES FOR WEARSHOE INSERTS. INSTALL ALS7-1032-130 PER SECTION D-D (44 PLACES) AFTER FINISH. INSTALL AN3-4A BOLTS AND AN960JD10L WASHERS WITH SIKAFLEX-241.
- 6) WELDING TO BE DONE PER DART QSI 004.
- 7) FINISH:
ACID ETCH, ALODINE PER DART QSI 005 4.1 PRIOR TO INSERTING D2596 WEB
POWDER COAT ASSEMBLY GLOSS WHITE (REF 4.3.5.1) PER DART QSI 005 4.3
BLACK ANTI-SKID PAINT AS INDICATED PER DART QSI 005 4.4
- 8) INSERT D2594-1 PLUG C/W D2594-3 O-RING IN HOLES MARKED 'P' (BOTH SIDES OF TUBE) AFTER FINISH (16 PLACES).

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SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 27914A



DETAIL B

SCALE 5:24

#00-08-28
D2576-3

GRIND FLUSH (4 PLACES)

GRIND FLUSH

STEP

LOCATION RIDGE ON UNDERSIDE OF D2576

1/4"

Technical drawing showing a cross-section of a circular component with a bolted cap. The drawing includes the following labels and dimensions:

- DRILL PRIOR TO D2575 CAP INSTALLATION (2 PLACES)**: Points to the two locations where the cap is attached.
- SEAL WITH SIKAFLEX-241**: Points to the sealant applied around the cap.
- AN3-4A BOLT (1)**: Points to the bolt used to secure the cap.
- AN960J10L WASHER (1) (2 PLACES)**: Points to the washers used to secure the cap.
- D2575 CAP**: Points to the cap being installed.
- 0.208**: Dimension indicating the thickness of the cap.
- 0.40**: Dimension indicating the distance from the center of the bolt to the edge of the cap.

Diagram of a wheel assembly with the following labels and instructions:

- D2579 SPACER
- D2596 WEB (REF)
- ALS7-1032-130 (REF)
(TYP 44 PLACES)
- AFTER PERFORM:
 1. CHA
 2. INS
 3. WE
 4. C'B

AFTER DRILLING AND BENDING ASSEMBLY
PERFORM THE FOLLOWING FOR #0.508 HOLES ONLY:

1. CHAMFER HOLE 0.050 X 45°
2. INSERT D2579 SPACER (20 PLACES)
3. WELD INTO PLACE AND GRIND FLUSH
4. C-BORE D2579 SPACER TO $\phi 0.437$ X 1.00 DEEP

37.50
DISTANCE TO AFT END
OF D2596 WEB

3
7

1.750 1.750

#0.508 (TYP.)
(40 PLACES)

REFER TO DETAIL A

8.750

17.375

26.000

34.188

57.313 (REF)
7 EQUAL SPACES
8.188 PITCH

38.0

91.500

190.0
(D2500-1)

REFER TO DETAIL A

0.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5

WELD AS PER DETAIL B

BLACK ANTI-SKID TOP OF STEP TO 0.5 ABOVE BOTTOM EDGE

BLACK ANTI-SKID TO 0.5 ABOVE LOCATION RIDGE

REFER TO DETAIL C

D2577-3 D2577-5 D2577-1

8

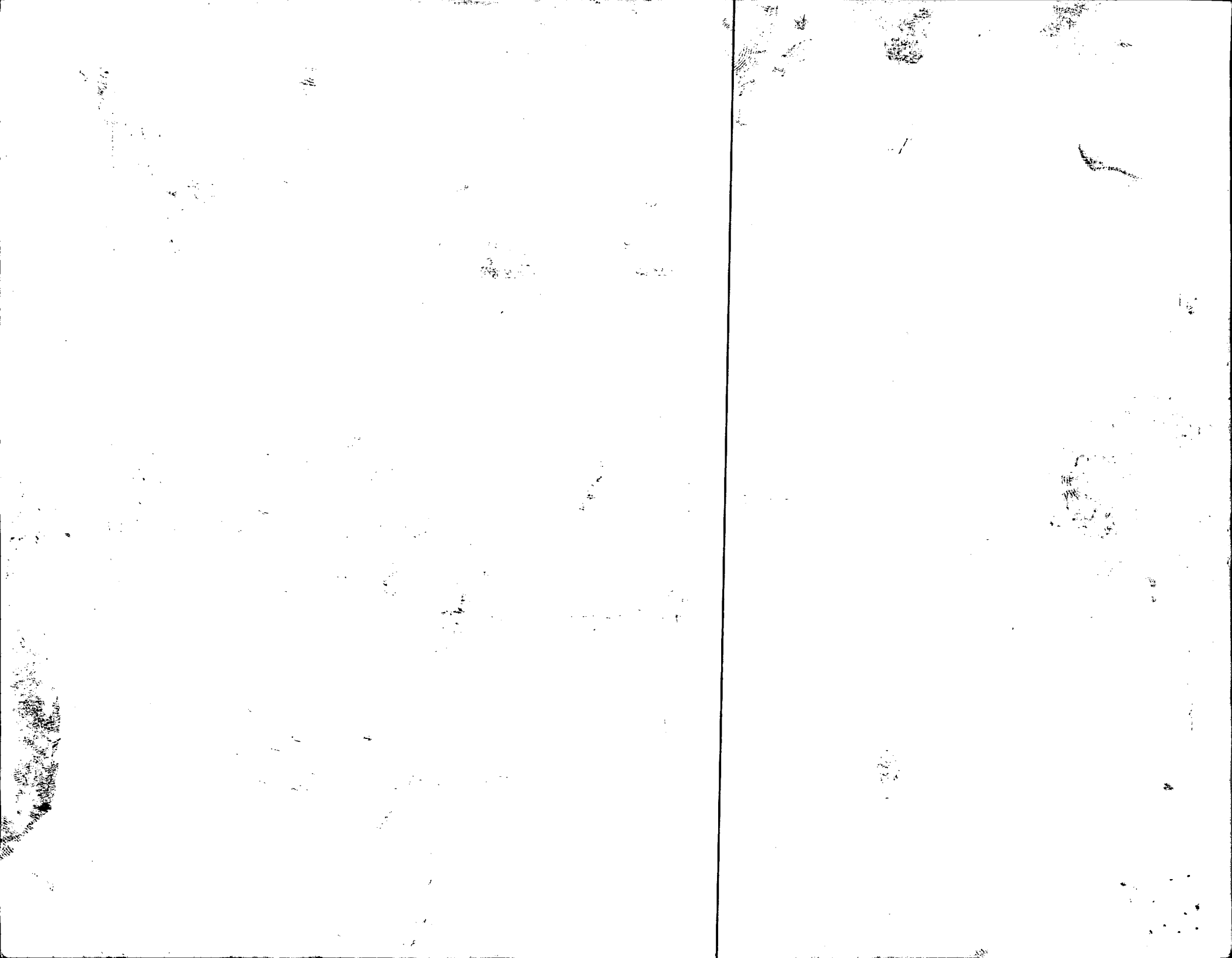
AN3-4A BOLT (1)
AN560J10L WASHER (1)
(44 PLACES)

DESIGN	DRAWN BY	PART
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RELEASED
98/09/17 DS

DESIGN <i>DAF</i>	DRAWN BY <i>CP</i>	DART	DART AEROSPACE LTD HARRISBURG, ONTARIO, CANADA
CHECKED <i>DAF</i>	APPROVED <i>JS</i>		
DATE 98.08.26		TITLE 205 SKIDTUBE ASSEMBLY	SCALE 1:24

D2596
 ALST-1032
 SHOP COPY
 RETURN TO
 ENGINEERING
 UNCONTROLLED COPY
 SUBJECT TO AMENDMENT
 WITHOUT NOTICE
 WORK ORDER
 29914



Dan Stow

From: David Shepherd [dshepherd@dartaero.com]
Sent: Wednesday, August 02, 2006 2:18 AM
To: 'Jason Murdoch'
Cc: 'Dan Stow'; 'L Lacelle'
Subject: RE: 205 pics

Jason,

If the saddle fits OK and the I-beam is not comprimised, then a slightly SHORTER skidtube is acceptable.
A LONGER skidtube would NOT be acceptable because it would lead to more vibration.

David

-----Original Message-----

From: Jason Murdoch [mailto:jmurdoch@dartaero.com]
Sent: Tuesday, August 01, 2006 7:18 AM
To: davids@dartaero.com
Cc: Dan Stow
Subject: FW: 205 pics

I have a bent 205 skid. If you look at dwg D2580 the dim from the fwd end to the center of most fwd saddle hole is 32.0", and this one is 30.375"ish. This was caused by the bend being started in the wrong location: right in front of the fwd saddle holes. However the outside ridge is still straight if you wanted to install a saddle, but the tube is still short in front. I dry fitted a saddle on the ridge to see if it would cause a problem and everything seemed ok. Also I inspected the "I" beam inside seeing as how the bend was started close to the saddle holes, and as far as I could tell everything is fine.

jmurdoch@dartaero.com
Q.C.Inspector

jmurdoch@dartaero.com
Q.C.Inspector

-----Original Message-----

From: Dan Stow [mailto:dstow@dartaero.com]
Sent: August 1, 2006 8:50 AM
To: Jason Murdoch (E-mail)
Subject: 205 pics